Duqm
الدقم
المنطقة الاقتصادية الخاصة
Special Economic Zone
Sultanate of Oman
سلطنة عُمان

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT GUIDELINE

Prepared by Environmental Sustainability Department

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1 INTRODUCTION

The Special Economic Zone Authority Duqm (SEZAD) was established as per the provision of the Royal Decree (RD) 119/2011 and is responsible for the management, regulation, and development of all economic activity in the SEZD. Environment Authority (EA) is national environmental regulator for the Sultanate of Oman. Per RD 79/2013, the Special Economic Zone Authority Ad Duqm (SEZAD) shall have the functions of the EA in relation to issuing environmental permits and conditions and all environmental licensing and regulation for the projects and take necessary environmental measures in SEZ Duqm.

On 18th August 2020, a Royal Decree 105/2020 – Establishing the Public Authority for Special Economic Zones and Free Zones and defining its functions, was issued by Sultanate of Oman. As per the RD, Public Authority for Special Economic Zones and Free Zones (OPAZ) will oversee the Special Economic Zone at Duqm (SEZAD), free zones in Sohar, Salalah and Al Mazunah and any other special economic zone or free zone that may come up in the Sultanate. Accordingly, OPAZ will manages, regulate and develops all economic activities in the Duqm SEZ.

This document shall serve as a guideline for the companies for conducting the Environmental and Social Impact Assessment (ESIA) studies as per the OPAZ Decision No 17/2021. RD 5/2016 and RD 44/2014 amending RD 119/2011, include the site and boundaries of SEZ pertaining to Wilayat Al-Duqm, which shall be under SEZAD's jurisdiction and is as shown in 0.

1.1 IMPORTANCE OF ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) TO PROJECTS

An Environmental and Social Impact Assessment (ESIA) is a process that starts at the conceptual design stage of a project and continues throughout project construction, operation and decommissioning. The purpose of an ESIA is to identify the positive and negative impacts caused by project implementation. This is assessed through an analysis of the effects resulting from interaction between environmental and social components and the various activities of a project and its development, including temporary (for example, during construction) and associated facilities.

Associated facilities are (as defined by the International Finance Corporation IFC) facilities that would not have been constructed or expanded if the project did not exist and without which the project would not be viable (IFC 2012).

1.2 DEFINITIONS

Unless contrary intentions appear in these guideline –

a. "*Guidelines*" means the Environmental and Social Impact Assessment Guideline, 2021 for SEZAD, Rev 1
b. *"Project"* means project concerning establishment of industries and development activities either existing or proposed to be initiated in the SEZAD.
c. *"Proponent"* means the individual or organisation proposing to initiate a project.
d. "*Screening*" means action undertaken to determine whether or not environmental impact assessment is necessary.

1.3 OBJECTIVES OF THE GUIDELINE

The objective of this guideline are as follows -

1. Assist in the assessment of likely environmental and social impacts from the implementation of the project;
2. Identify, assesses and specify methods, measures and standards, technologies to be included in the detailed design, construction and operation of the proposed developments which are necessary to mitigate these environmental impacts and reducing them to acceptable levels;
3. Design and specify environmental monitoring and audit requirements, to ensure the implementation and the effectiveness of the environmental protection and pollution control measures adopted;
4. Facilitate to integrate environmental consideration into the Project planning cycle;

5. Help decision makers in determining whether the project may be implemented or not form an environmental perspective.

1.4 GENERAL REQUIREMENTS

The environmental requirements, given below, are generic and applicable to all companies and industries in the Special Economic Zone (SEZ). Compliance with this Guidance Note shall be a condition in the environmental permit.

1. SEZAD shall have the sole authority of issuing environmental permits and applicable licenses and taking the necessary action for the protection of the environment, the prevention of pollution and protection of potable water resources from pollution pursuant to the laws in force within the SEZ area;
2. SEZAD shall have jurisdiction for areas (onshore and offshore) within the SEZ boundaries provided in RD 5/2016;
3. The development of any project must be in conformity with the Omani Regulations/Ministerial Decisions outlined by the Government of Oman and SEZAD guidelines;
4. The Operator shall adopt and implement the IPPC Best Available Techniques (BAT) approach as a governing principle for the project design and environmental management;
5. The findings and recommendations of the ESIA effort should be documented clearly and concisely in the report and any necessary technical details should be provided, especially those regarding baseline data;
6. An ESIA study report, which also include the Environmental Management Plan (EMP) for all phases of development of the project, shall serve as a guidance for the Owners/Contractors;
7. All Environmental Report submission to SEZAD shall be with an official cover letter and the Environmental Report shall be approved by the Client and approval shall be included in the report;
8. SEZAD can modify any conditions in an environmental permit at any time when required by changes in Omani legislation or Best Available Techniques (BAT) or from results of environmental performance;
9. SEZAD, as part of public disclosure policy, will provide the list of projects for which the ESIA study has been approved, in the website. The following information will be posted on the SEZAD's website (in both English and Arabic);

   A non-technical summary of the project, including the project location, description of the project, likely impacts and proposed mitigation measure shall be uploaded onto SEZAD website.
10. Consultants registered with Environment Authority can conduct environmental studies for projects within SEZAD.

2 ENVIRONMENTAL PERMITTING PROCESS

For SEZ area, SEZAD will assess the activities and formulate requirements for the environmental permit and based on the Category of Projects, the process shall have the phases as shown in

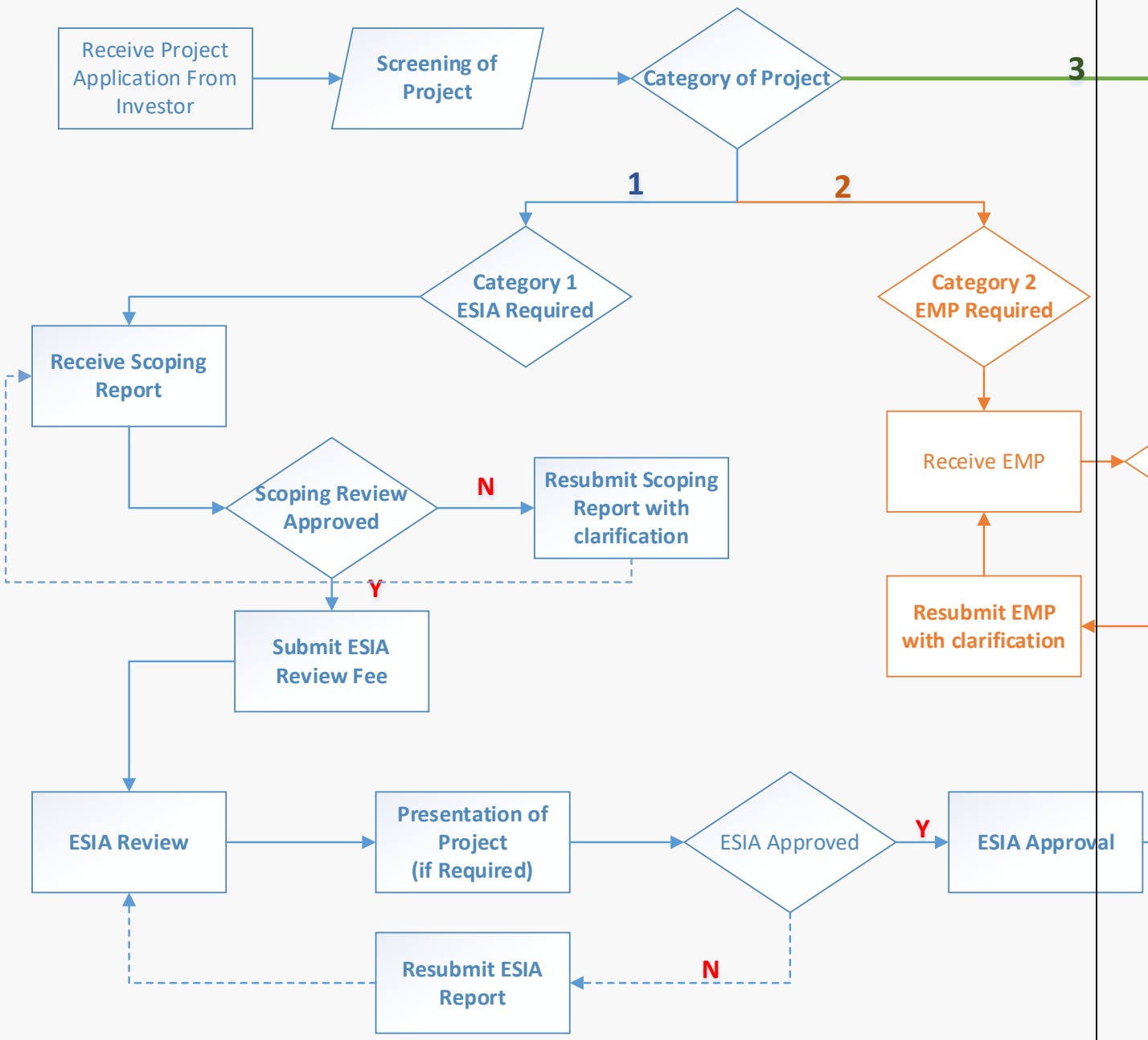

Figure 3-1.

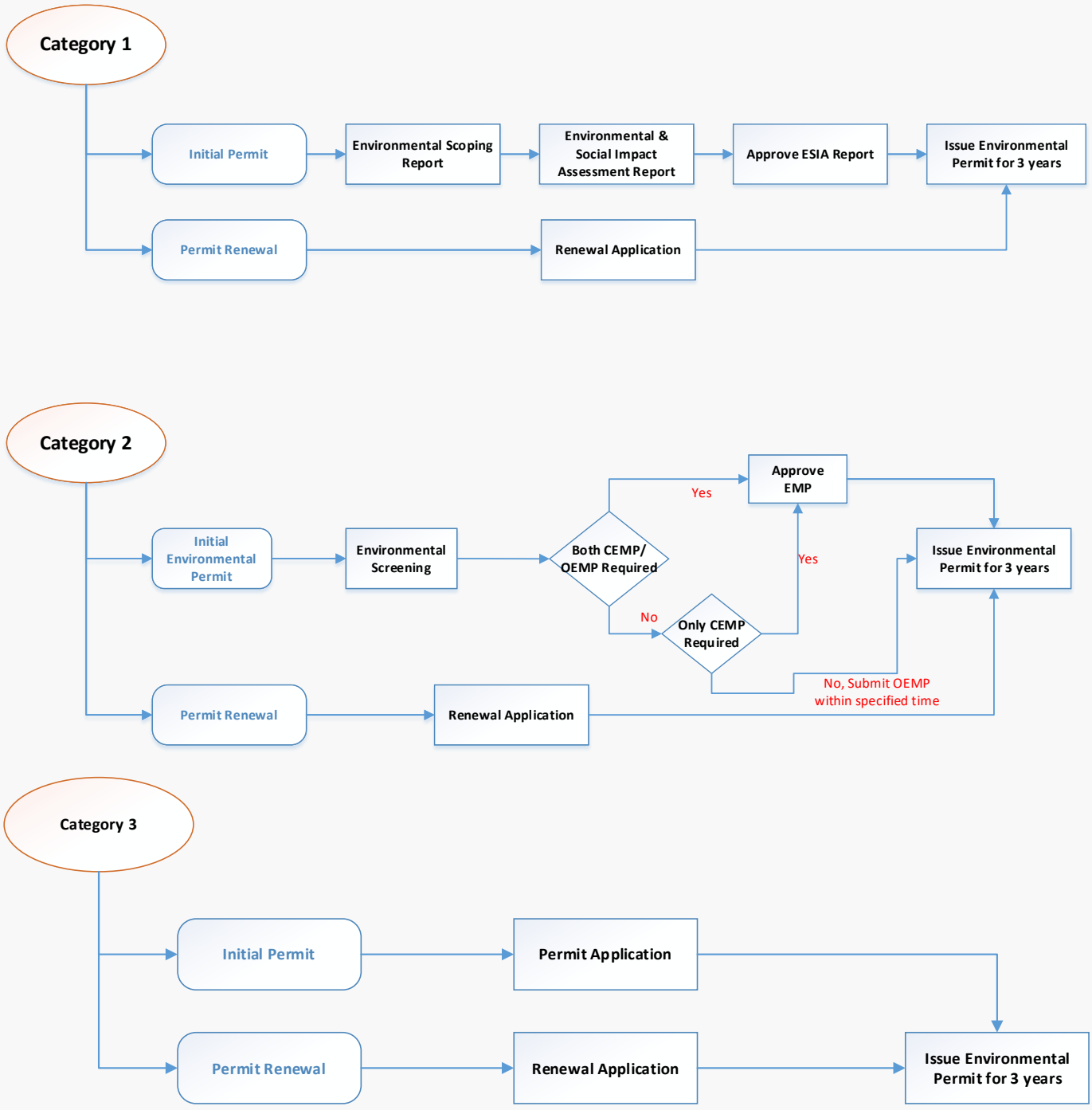

Figure 2-1 – Permit Issuance Process

3 THE ESIA PROCESS

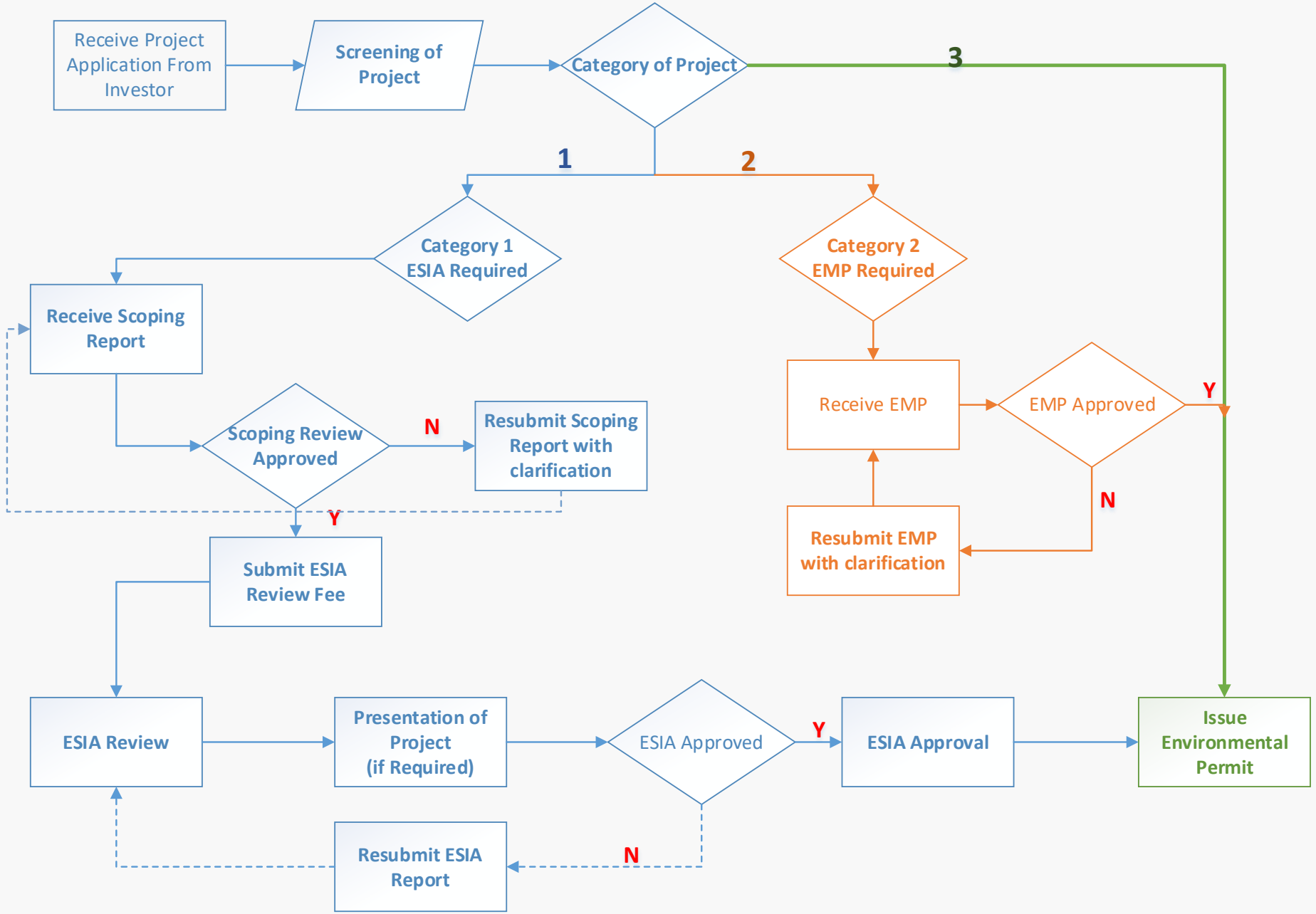

Figure 3-1: Phases of ESIA process

3.1 PROJECT SCREENING

The first task is to determine whether an Environmental and Social Impact Assessment (ESIA) need to be prepared. This is often referred to as 'screening'. This guidance note includes list of projects for which ESIA/Environmental Management Plan (EMP) must be prepared. However, it is important to note that SEZAD can also require an ESIA/EMP for a project not included in the list of projects requiring ESIA or EMP. This usually arises where there is a likelihood of significant effects on the environment by reference to the nature or location of a project e.g. potential impact on a designated conservation site or sensitive environments.

On receiving project application, SEZAD shall decide on whether an ESIA is required or not. On completing the screening exercise, SEZAD shall provide a screening opinion, indicating whether a detailed assessment is required or not. OPAZ Decision No:17/2021 lists the project which requires an ESIA study. In addition, Appendix-B of this guideline gives an illustrative list of projects, which require an ESIA study.

The screening process shall divide the project proposals into the following main categories –

1. Project which require an ESIA (Category 1 Projects);
2. Project which require an EMP (Category 2 Projects)
3. Project which do not require an ESIA or EMP (Category 3)

3.1.1 Project which require an ESIA

ESIA is a tool used to assess the environmental consequence of proposed development projects, programmes and policies and propose relevant management actions to mitigate any adverse risk. ESIA identifies not only adverse consequences but also positive effects of a development activity and identify ways of enhancing them further. The goal is to produce good decisions about whether or not a project should proceed, and if so, under what conditions.

The study therefore requires a multi-disciplinary approach. The study shall:

1. Identify sources of impact of the project activities, during construction, operation and decommissioning stages, on the various environmental components;
2. Predict the impacts using quantitative and qualitative methods;
3. Recommend an environmental management plan to reduce adverse impacts and enhance positive contribution of the project;
4. Present the result of Impact identification, prediction and assessment with suggested mitigative measures;
5. Set basis for continuous monitoring of key project activities.

If an ESIA is required, the project shall first provide a Scoping report as step 1 of the ESIA and permit process.

1. Scoping report shall identify the topics and methodologies that need to be studied in the ESIA.
2. On the approval of scoping report, an ESIA report has to be prepared and submitted to SEZAD for review and approval.

SEZAD shall then carry out: -

1. Reviewing, assessment of the ESIA and identification of lack of information or further requirements
2. Approval of ESIA study and setting the conditions for the ESIA approval.
3. The project then proceeds for environmental permitting by submitting environmental permit application though SEZAD

3.1.2 Projects which require an EMP

Based on the screening of Project, if the project is Categorised as B, the Proponent might be required to submit an Environmental Management Plan. The EMP requirement is further described in Chapter 6. Depending on the type of project, the proponent may be required to submit a Construction Environmental Management Plan (CEMP), an Operational Environmental Management Plan (OEMP) and Decommissioning Environment Management Plan (DEMP) or only one of the EMP, depending on the project.

3.1.3 Project which does not require an ESIA or EMP study

For projects that do not require an ESIA study, the Proponent can apply for the environmental permit through online service along with all the documents as required by SEZAD.

4 SCOPING STUDY

Scoping determines the content, extent of the matters that should be covered and the methodology followed in the environmental information to be submitted to SEZAD for projects prior to ESIA. The scoping study shall be undertaken by the developer's Environmental Consultants. SEZAD shall issue a Scoping Comment/Approval, to the developer on the scoping report, which shall form the terms of reference for the ESIA. The scoping report shall not be more than 7 to 9 pages, excluding appendices.

4.1 SCOPING REPORT

Scoping report shall primarily focus on identifying the impacts to be assessed and which of these are most important, and shall also address the following matters:

- The project details and schedule;
- The baseline studies which are required to characterise the existing environment including any special requirements for baseline studies regarding their geographical extent or timing e.g. because of seasonal changes in fauna and flora;
- The level of detail of investigations required;
- Methods to be used in ESIA to predict the magnitude of environmental effects;
- The criteria against which the significance of effects shall be evaluated;
- Types of mitigation to be considered;
- Consultations that has to be carried out during the environmental studies; and
- The structure and content of the ESIA report.

The table of content for the scoping report is presented in 4.1.1 to 4.1.7.

4.1.1 Introduction

A brief summary of the key points that presents only the main conclusions and options for decision-making. Further name and contact details of the Project Proponent and the Consultant should be included and shall be limited to a page.

4.1.2 Description of Project

A brief summary description of the development, its purpose, scale, design, schedule for construction and implementation, expected raw materials, utilities, man power, products and by-products from the project construction and operational phase. A plan showing the boundary of the development including any land required temporarily during construction should also be included and not exceed more than two pages.

4.1.3 Environmental Baseline Studies

The baseline chapter shall also provide details on the baseline surveys to be undertaken during the ESIA stage. This section shall include the below minimum information at a minimum:

- Exact locations and numbers to be monitored for all surveys;
- Details on monitoring methods and durations of sampling;
- Maps identifying baseline monitoring;
- List of desk based research data and publications that will be used to provide baseline information; and
- Modelling details, if relevant or required

If baseline survey is not envisaged for any particular component, justification for the same should be included in the report.

4.1.4 Environmental Releases, Impact Identification and Mitigation Measures

A description and evaluation of the potential impacts on the environment and any uncertainties, data gaps or assumptions involved during construction and operation phase. Data sources and information used in the identification and evaluation process should be referenced in the report. Reference to mitigation and compensation measures should be included in scoping report but detailed descriptions of mitigation and monitoring measures and arrangements for their implementation need to be included only in the ESIA report. Section shall be tabulated

4.1.5 ESIA Methodology

Tabulate or briefly explain the subsequent ESIA approach and methods used to monitor, identify, predict and assess impacts and the list of data sources.

4.1.6 Conclusion

The important conclusions regarding potential environmental effects, mitigation, uncertainties and the proposed methodology for the Project shall be included in this section.

5 ESIA REPORT

The ESIA report should contain a brief introduction explaining the need for and context of the project. This document should have the following content:

- Executive Summary
- Introduction
- Legal Framework
- Description of the Project
- Description of the site and environment – Baseline Study
- Significant Environmental Releases
- Identification and Analysis of Alternatives
- Analysis of Best Available Techniques
- Climate Affairs – Mitigation and Adaptation (as per Civil Aviation Authority requirement)
- Impact Identification and Assessment
- Environmental and Social Management Plan
- List of References
- Appendices including
  - Reference documents, photographs, unpublished data
  - Calculations, details of air/water/noise quality modelling done, if any
  - Risk Analysis report, if applicable
  - Consulting team composition
  - Notes of Public Consultation sessions

5.1 EXECUTIVE SUMMARY

The Executive Summary should summarize the significant findings of the ESIA report and the study's conclusions. It must include a short description of the proposed project, a brief summary of the key findings of the baseline characterization, generation rates and characteristics of waste streams, a brief summary of the most critical environmental aspects, nature and magnitude of the most significant impacts. A brief description of how significant environmental issues will be resolved as well as the appropriateness of the approach to resolve it shall also be included.

The information should be concise and meaningful and should make use of base maps, tables, and figures, wherever possible and in dual language (English and Arabic).

5.2 INTRODUCTION

A brief introduction of the project shall be presented in this chapter and shall include information, data, and details relevant to the proposed project. The chapter may be organized to include the following sections, which are discussed below:

- Project Title and Project Proponent - This section should include the name, address, telephone number, and fax number of the proponent's firm; the name and designation of the contact person who is responsible for the project; the project's title; and a listing and brief description of any other projects that the proponent has conducted, is currently conducting, or will conduct on the same site or adjacent to the current proposed project.
- Project Description and Rationale - This section should include a description of the type and components of the proposed project () and the location and size of the project area. This section should also include the purpose and rationale or justification (e.g., economic and/or social) for the proposed project.

- Schedule for the Development of the ESIA report - This section should describe the schedule of the project including construction period.
- ESIA Consultants - This section should include the name, address, telephone number and fax number of the consultant's firm; the names of team members from that consultant firm who prepared the ESIA report (and e-mail address for the key contact); and the field(s) of expertise of the consultant firm and the individual team members.

5.3 LEGISLATIVE FRAMEWORK

This Chapter should include references to all relevant Regulations/Royal Decrees/Ministerial Decisions, and local and national planning policies applicable to the particular project, site and surrounding area.

For areas where Omani regulations are not available, applicable international regulations/guidelines may be referred to, specific to the industry/project.

5.4 PROJECT DETAILS AND DESCRIPTION

The purpose and physical characteristics of the project, including details of proposed access and transport arrangements and numbers of workers to be employed and where they will come from. A suggestive list for this section is given below:

- Description of the production processes and operational features of the project;
- Location and project layout plans, maps, diagrams and photographs showing boundary of the project including any land requirement during construction;
- Infrastructure and utilities including raw materials, fuels, chemicals to be used, their quantities, arrangement for transport, storage and handling;
- Products and by-products, quantity, storage, handling and transport;
- Requirement and details of utilities within the project site and their capacities viz boilers, furnaces, desalination plant, workshop, laboratories, treatment plant, power plant, pipeline network, storm water network, drainage network etc, as applicable;
- Construction methods and resources used in construction and operation (materials, waster, energy, etc.);
- The relationship with other existing/planned projects;
- Other activities which may be required as a consequence of the project (eg new roads, extraction of aggregate, provision of new water supply, generation or transmission of power and sewage treatment and/or disposal)

5.5 PROJECT ALTERNATIVES

A systematic comparison of the proposed investment design, site, technology and operational alternatives in terms of potential impacts, suitability under the local conditions, monitoring requirements etc shall be included in the ESIA. The analysis may lead to designs that are sounder from an environmental, socio-cultural or economic point of view than the original plant design. The ESIA shall also include a "no action" alternative i.e. not constructing the project in order to demonstrate environmental condition without it. For example, if the project were to be sited elsewhere, the impacts associated should be reviewed and the associated mitigation action and costs defined. Include the following:

a) An analysis of the alternative means of carrying out the Project, including need for the project, alternate projects and scope of the project (major components included and excluded). For the project components, include a comparison of their environmental and technical performance potential and other relevant variables;

b) Rationale for the decisions made by the Owner about project component alternatives including how environmental, socioeconomic, community information and project design. Discuss the status of any ongoing analyses, including a discussion of the options not chosen and the rationale for their exclusion;

c) Contingency plans if major project components or methods prove infeasible or do not perform as expected; and

d) An analysis of the "no action" alternative. The no project alternative will be considered as the baseline against which the environmental effects of the project should be considered.

e) Assessment of management of waste stream as per Integrated Pollution Prevention and Control (IPPC) Best Available Techniques (BAT) requirements.

5.6 SITE DESCRIPTION AND ENVIRONMENTAL SETTING

The ESIA must be a site specific and project specific study. An ESIA for a particular development, in a particular setting, cannot be transferred either to another development or to the same development in another setting. The ESIA is a multi-disciplinary study that must span the relevant aspects of the natural and built environments. Critical areas to be studied will be dependent on the project site and the project details.

This description of the environmental setting is a record of conditions prior to implementation of the proposed project. It is primarily a benchmark against which the environmental changes shall be measured in future and the potential impacts assessed. The environmental setting of an area may be sourced from both primary and secondary surveys/data.

5.6.1 Baseline Data Gathering

Data Collection and interpretation should involve a combination of desktop research and field reconnaissance and investigation and structured interviews. The existing sources of information may include

- Databases
- Reports
- Experts from government organization
- Previously developed ESIA's for the area
- Local Community
- Aerial Photos and Satellite Imagery

Primary information can be acquired through

- Fieldwork which include surveys, photography etc
- Interviews
- Monitoring

Each of the realms of environmental data should be investigated, viz. physical, biological and human, and the relevant aspects included in the study.

5.6.1.1 Physical Environment

Several aspects of the physical environment must be considered during the baseline data gathering. The presentation of the information in the ESIA report may follow the basic sequence below, as applicable to the project:

- Climate, including the relevant meteorological considerations
- Topography and Landscape;
- Geology/Geomorphology including soil quality, hazard potential. Companies in SEZ, as required, shall conduct a Zero Assessment Baseline Survey (soil and groundwater) and an End Survey, for the beginning and end of a tenant's lease period, respectively.

- The zero survey report has to give a very clear description of the soil quality at the beginning of the tenancy period and shall serve as the reference quality for the plot.
- If the End survey indicates new or increased contamination of soil (ground or groundwater) the tenant shall be liable to propose and carry out a mutual agreed plan to remediate the contamination to the level of the zero survey.

- Hydrology and Hydrogeology including surface drainage pattern, groundwater quality, location of wells, wadis, etc;
- Coastal Morphology;
- Marine water and Sediment Quality;
- Air quality including dust and odour - Air Quality monitoring shall be done using air quality monitoring station (AQMS). Diffusion tubes shall not be used unless approved by SEZAD. Air quality monitoring shall include $PM_{2.5}$ along with PM_{10} measurements.
- Noise Quality.

5.6.1.2 Biological Environment

The biological environment includes several inter-related components, which are based on the physical supporting structure. The baseline status of the flora and fauna, rare or endangered species, sensitive habitats etc. in and around the study area shall be properly determined. This should include the terrestrial and aquatic ecosystems. Further, if there exists any wetland/khwar/wadi or marine areas within the study region, the ecosystems of the said region shall also be studied for ascertaining the baseline condition.

For projects having direct impact on marine environment, during any phase of the project activities, a detailed primary data collection (marine baseline survey) has to be done to be integrated in the baseline report.

- Review secondary data sourced from existing studies in the Project Area.
- Collect primary and secondary data on the following receptors present in the Project Area:
  - Intertidal, rock shores and beach ecology and beach sediment types;
  - Coral reefs;
  - Fish;
  - Seagrass;
  - Marine mammals;
  - Marine turtles;
  - Marine water quality;
  - Seabed sediments;
  - Macro benthos community; and
  - Metocean (wind, wave and climate) data.
- Review available desktop data of distribution and status of coastal habitats such as shoreline habitats, sea grass, and coral reefs.
- Any Other Sensitive Species

The section shall include a map showing the species distribution for the biological environment, within the project influence area.

5.6.1.3 Socio-Economic Environment

Aspects of the socio-economic environment has to be determined by the physical and biological environment, and the information may be presented according to the following sequence:

- Population and Demographics
- Land and Livelihood /Employment
- Settlement patterns and Social structure
- Services –including health, educational, recreational, waste management facilities available
- Natural Hazard Vulnerability and History
- Recreational activity
- Archaeological heritage
- Cultural values

For a project site, chance findings of any archaeological artefacts of importance shall be intimidated to SEZAD though the chance find form available online and required permission obtained prior to commencing of work. The chance find forms can be downloaded from Chance Find Form.

5.6.1.4 Public Consultation

Consultation with stakeholders is an essential part of the ESIA process. Its main objective is to establish a dialogue with those parties who may have an interest in the outcome of the ESIA and to identify sources of information. In most countries with developed ESIA regulatory procedures, consultees typically include, government and non-governmental organisations with environmental responsibilities, local regulatory bodies, technical personnel who are part of the project design team and for major projects, members of the public. Depending on the type of project, public consultation may be required, as part of the ESIA study, within SEZ. The purpose of public consultation shall be and not limited to the following:

- inform the public about the project and potential environmental issues;
- receive public input about environmental concerns regarding the proposed project; and
- identify environmental issues not previously addressed by the proponent.

This section, shall hence, describe and document the public consultation program and record any concerns or suggestions made by the public and demonstrate how these concerns have been addressed, or responded to. The section shall also discuss:

- how the concerns and issues identified by stakeholders influenced the project development, design, impact mitigation and monitoring, or how it was addressed or discounted;
- the type of information provided and the issues discussed, including those that have been resolved and those that remain outstanding;
- in consideration of unresolved issues, the key alternatives that have been identified by the Owner and stakeholders for future consultations as well as mechanisms and timelines for that resolution;
- plans to maintain and support the public consultation process following completion of the ESIA review;
- Grievance Redressal Mechanism proposed by the Owner; and
- any agreements reached with Owner and stakeholder regarding the Project operations and activities.

It shall be noted that within SEZAD, any public consultation, GRM etc shall be in line with and in consultation with SEZAD Partnership and Development Department (PDD).

5.6.1.5 Grievance Redressal Mechanism (GRM) for Projects in SEZ

The Proponent shall implement a Grievance Mechanism, during both the construction and operational period of projects, to ensure that all complaints from local communities are dealt with appropriately with corrective actions being implemented and the complainant is being informed of the outcome. The mechanism shall be accessible to diverse members of the community, including more vulnerable groups such as women and youth. Multiple means of using this mechanism, including face-to-face meetings, written complaints, telephone conversations should be available. Confidentiality and privacy for complainants should be honoured, where this is seen necessary or important.

A grievance redress mechanism and procedures shall be setup to provide opportunity for project affected persons to settle their complaints and grievances amicably. The established grievances redress procedures and

mechanism ensures that project affected persons are provided with the appropriate compensations and that all administrative measures are in line with the law. It also allows project affected persons not to lose time and resources from going through lengthy administrative and legal procedures. Grievances are first preferred to be settled amicably.

The GRM shall be in line with SEZAD GRM (SGRM), which can be accessed at SEZAD GRM.

5.7 PROJECT RELEASES

This chapter shall provide an inventory of expected residues and emissions by type, quantity, composition from the project construction, operational and decommissioning activities, as applicable. The environmental releases will typically comprise of the following, depending on the type of projects –

- Discharges to water;
- Process and domestic wastewater;
- Deposits/residues to land and soil.
- Emissions to air from stationary point sources, mobile sources, area sources etc;
- Noise -day and night during construction and operation;
- Vibration.

The methods of transportation, handling and storage of raw materials, chemicals, fuels and final products, details of generation, handling, storage, management and disposal of toxic and hazardous wastes and details of types, handling and disposal of radioactive materials shall be identified and included in the chapter, as applicable, to the project.

5.7.1 Management of Hazardous Materials and Waste

SEZAD has developed an Integrated Waste Treatment, Storage and Disposal Facility (IWTSDF), in coordination with Be'ah (Oman Environmental Services Holding Company S.A.O.C), covering the waste management activities in Duqm to reduce adverse impacts to the environment and health of nearby communities. For any projects proposed in SEZAD, the Proponent shall identify the various types of hazardous and non-hazardous waste expected during the project phases. An agreement between the project Proponent and be'ah which agrees to accept the waste, shall be included, in either the ESIA report or submitted to SEZAD prior to commissioning of facility.

For waste not accepted by be'ah as per the agreement submitted to SEZAD, the Company shall provide temporary on-site facility and subsequent treatment/disposal/storage method shall be proposed and submitted to SEZAD, prior to commissioning of the Project, as per MD 18/93 and MD 56/2002. The Company shall be responsible for transport and disposal, of the waste, in the be'ah facility, once it becomes operational.

5.8 IDENTIFICATION AND ASSESSMENT OF IMPACTS

The assessment of the environmental impact of a development is the main focus of the ESIA and therefore the methods used to predict and evaluate the impact are critical to the credibility of the ESIA. The assessments should therefore be set out in a clear and structured manner in order to clarify how the judgments have been reached. The extent and quality of available data, key data gaps and uncertainties shall also be addressed.

The assessment stage of the ESIA should follow a clear progression from the characterisation of the impacts to the assessment of the significance of the effect. It is important that a consistent approach to terminology is used, as confusion often occurs over the difference between impact and effect. The use of the terms should be explained clearly within the report. This Chapter should include the following:

1. List or tabulation and description of environmental aspects;
2. The impact assessment matrix used for assessing the effects.
3. Assessment and criteria for determining the significance of environmental impacts/issues.

4. Discussion of residual, unavoidable and cumulative impacts, (where relevant and appropriate).
5. Tabulation of Significant Environmental Impacts/Issues.
6. Conclusions of modelling done (where necessary) to forecast the nature and extent of the identified environmental impacts.

5.8.1 Impact Assessment Methodology

The purpose of impact assessment and mitigation is to identify and evaluate the significance of potential impacts on identified receptors and resources according to defined assessment criteria and to develop and describe measures that will be taken to avoid or minimise any potential adverse effects and to enhance potential benefits. A Project activity could include site preparation, construction, reinstatement, operation and decommissioning. It would also encompass planned routine activities, planned but non-routine activities and unplanned or accidental events.

All prediction techniques, by their nature, involve some degree of uncertainty. The data used to estimate the magnitude of the main impacts should be clearly described in the assessment and any gaps in the required data identified. Where possible, estimates of effects should be recorded in measurable quantities with ranges and/or confidence limits defined. Qualitative descriptions, where necessary, should be appropriately defined.

5.8.1.1 Impact Significance Rating Matrix

Impact severity, is driven by a range of factors including the geographic extent of the impact and the duration of the impact. Consequence or intensity is driven by receptor vulnerability / sensitivity to any given impact and the ecological functional value of the receptor. The evaluation of impact significance for an impact may be done using the following guidelines to identify the area of influence, duration, intensity (or magnitude) and type of impact.

Significance = Severity or Magnitude of Impact × Sensitivity of Receptor

After predicting the extent of impact, it should be determined whether the changes are significant enough to warrant mitigation measures. This may be evaluated based on the following considerations, at a minimum,

1. Comparison with SEZAD requirement, if any
2. Comparison with Omani and international laws and regulations
3. Sensitivity of the receptor
4. Severity of impact (reversible, irreversible)
5. Prevalence of Impact (extent of impact) –
   - Duration and frequency of the activity causing the impact
   - Risk (probability of environmental impacts)
   - Importance/Impact (Local, regional, national)

The impacts shall be rated 'No Impact', 'Low Impact'', 'Medium Impact'' or 'Major Impact'' significance based on the area of influence, spread and duration of the impact. Based on the rated significance, mitigation measures have to be proposed in the ESIA report.

The evaluation using the above criteria may be -

- **No Impact or Negligible** - Any impacts that are expected to be indistinguishable from the baseline or within the natural level of variation. These impacts do not require mitigation and are not a concern of the decision-making process.
- **Low Impact** - Impacts with a "low" significance is expected to be noticeable changes to baseline conditions, beyond natural variation, but are not expected to cause degradation, or impair the function and value of the resource/receptor. However, these impacts warrant the attention of decision-makers, and should be avoided or mitigated where practicable.

- **Moderate Impact** - Impacts with a "moderate" significance is likely to be noticeable and result in lasting changes to baseline conditions, which may cause degradation of the resource/receptor, although the overall function and value of the resource/receptor is not disrupted. These impacts are a priority for mitigation in order to avoid or reduce the significance of the impact.
- **High Impact** - Severe and/or persistent environmental damage that will require extensive measures to restore uses of the contaminated environment and that will lead to loss of commercial, recreational use, and/or loss of natural resources over a wide area. These impacts are a priority for mitigation in order to avoid or reduce the significance of the impact.

Depending on the evaluation and the rated significance, the ESIA study should proceed to seek solution for preventing or reducing the impacts to ALARP levels in the EMP for the project. Table below illustrates the rating based on severity and consequence.

		Receptor Sensitivity			
		Negligible	**Low**	**Moderate**	**High**
Impact, Magnitude (extent, frequency, reversibility, duration,)	**Negligible**	No Impact	No Impact	No Impact	No Impact/Low
	Low	Not significant	Low	Low/Moderate	Moderate
	Moderate	Not significant	Low/Moderate	Moderate	High
	High	Low	Moderate	High	High

5.8.2 Cumulative Impacts

Cumulative impacts can occur either when different impacts from one development interact to exacerbate effects on sensitive receptors, or when the magnitude of an impact of a development is augmented by impacts from other existing or future neighbouring developments, thus creating a more significant impact, on a receptor. The main issues to be considered while compiling cumulative impacts are -

- Impacts from proposed development with those from planned or reasonably foreseeable other developments, for example, proposed development of road, other projects together with traffic could cause adverse congestion, noise and air quality impacts.
- Cumulative impacts of particular concern and which should be addressed within the ESIA include:
  - Construction and operational phase impacts, particularly air quality, dust and noise and waste.
  - Traffic and Transport impacts
  - Impacts on health and safety.

Potential impacts identified for each relevant environmental topic during scoping should be assessed for their cumulative effect when combined with other potential impacts. A list of cumulative developments should include those already operational within the SEZ or under construction, and those known to be likely to be subject to application within the near future. A qualitative judgement shall be made as to the nature, magnitude and significance of the impacts and mitigation proposed to reduce any adverse impacts identified.

SEZAD has developed a Cumulative Impact Assessment Guideline and the same is available in CIA Guideline[1]. The CIA section in the ESIA report shall be prepared in line with the guideline.

1 https://www.duqm.gov.om/upload/files/guidelines/Cumulative%20Impact%20Assessment,%20Resource%20Efficiency,%20and%20Pollution%20Prevention%20Guideline.pdf

5.8.3 Modelling Studies

All the impacts identified shall be substantiated by a modelling study, as required by the project or as per SEZAD condition. For each model used in the assessment scenarios, the following, at a minimum shall be provided:

- justification for the model used;
- discussion of the calibration process for the model, including the limitations associated with using the model;
- a list of all parameters incorporated in the model with a brief description of their purpose, known range of values, whether set from literature, calibrated, or measured (derived from local data) and the value(s) used in the ESIA predictions;
- All data shall be submitted along with the ESIA report including all the data used for the modelling study

5.9 CLIMATE AFFAIRS

A project requiring ESIA is vulnerable to a changing climate, as are the communities and environment it poses a risk to. ESIA should therefore consider the potential resilience, both to the anticipated negative impacts and positive opportunities of climate change.

The Climate guideline, issued by Environment Authority in 2013, require the ESIA study to identify, describe and assess the direct and indirect effects of a project on the interaction between human beings, fauna and flora, soil, water, air, climate, the landscape, material assets and cultural heritage.

The vulnerability of a project to change in climate shall also be qualitatively assessed using the vulnerability matrix in its guideline. Measures and approaches for mitigating and adapting the project design and associated facilities to climate change will also be discussed in the chapter

5.10 ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN

An Environmental and Social Management Plan (ESMP) shall be attached with the ESIA study and/or submitted as a standalone document with the ESIA study. The ESMP shall be developed in line with the details provided in Chapter 6 of the report.

5.11 GENERAL REQUIREMENTS DURING ESIA STUDY

Some of the requirements which need to be followed by the Proponents, as applicable are listed below -

1. The Proponent shall submit BAT Compliance Certificate to SEZAD for verification of BAT technology used in the facility design, as applicable;
2. For Projects having marine interaction, required approvals or communications shall be conducted with all stakeholders including Environment Authority
3. For Projects involving use of marine vessels during any phases of the Project, an agreement letter from PDC shall be obtained which agrees to accept and treat all the waste from the marine vessels, as per the MARPOL convention or separate waste collection, handling and disposal facility for such waste shall be made available by the Proponent.
4. It shall be noted that on completion of construction phase, the Proponent shall submit an environmental audit report to SEZAD which shows compliance with ESIA/EMP report, environmental permit conditions and relevant Omani/international regulation. The audit shall be conducted within 30 days from start of operation.

5.12 CONCLUSION

This section describes the conclusions regarding e.g. preferred options compared to alternative solutions, important potential environmental effects, mitigation, decommissioning and remediation, uncertainties and public concerns.

5.13 ANNEXURE

1. References
2. List of ESIA contributors (individuals and organisation)
3. Details of numerical modelling studies (if any) and any calculation sheets;
4. Information sources, consultations, public participation;
5. Documentation including the Scoping process, Stakeholders' meetings engagement, list of contacts, and communications;
6. Results of laboratory analysis by accredited laboratories;
7. Additional related studies (e.g. Traffic Impact Assessment, Environmental Risk Assessment, Quantitative Risk Assessment, etc. where applicable and as required)
8. List of data source;
9. Any other information relevant to the ESIA study.

6 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Prediction of the potential adverse environmental and social impacts and developing measures to eliminate, offset, or reduce impacts to acceptable levels during implementation and operation of projects form the essential parts of an ESIA. It is recognised that it is seldom possible to eliminate an adverse environmental impact altogether, but it is often feasible to reduce its intensity. This reduction is referred to as mitigation.

EMP may be defined as a plan or program that mitigate activities, which have or could have an adverse impact on the environment. EMPs thus provide an essential link between the impacts predicted and mitigation measures specified within the ESIA report, and implementation and operational activities. The EMP shall hence follows the PDCA cycle throughout the project phase and integrate in into the project cycle.

- Plan - Planning, including identifying environmental impacts and establishing environmental goals.
- Do - Implementing, including employee training and establishing operational controls.
- Check - Checking, including auditing, monitoring and taking corrective action.
- Act - Reviewing, including progress reviews and taking action to make needed changes.

The management plan should thus include the following, as applicable;

1. All the measures that have been incorporated into the project design to reduce or to eliminate significant potential environment impacts identified during all phases of the project.
2. All possible contingencies, their impacts, mitigation measures, contingency plans;
3. Organizational structure of the Environmental Management team or office, administrative arrangements and staffing requirements;
4. Risk Assessment and Management, as applicable - Should include details on likelihood and possible effects of hazards associated with accidental release to the environment of hazardous materials, natural disasters (dam bursts, earthquakes, explosions, tank collapses, etc) or of site hazards, arrangements for the keeping, storing and use of hazardous substances;
5. Environmental Monitoring and auditing plan for all project stages

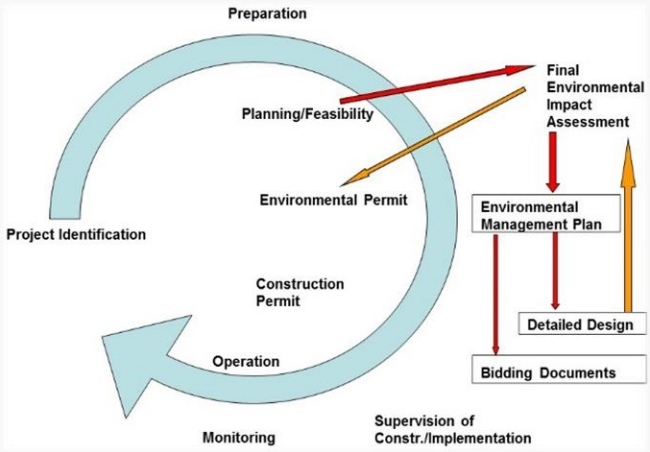

Figure 6-1:EMP Integrated into Project Cycle (World Bank)

6.1 INTRODUCTION

A CEMP/OEMP/DEMP is a practical plan of management measures which are designed to minimize environmental impacts from the construction, operation and decommissioning phase of a project. The CEMP will deal with construction related aspects and are designed to minimize environmental impacts from the construction, and it is envisaged that all development projects will require this document in some form. The OEMP will deal with those aspects of the operational facility which require ongoing and site specific management. The DEMP will deal with the decommissioning related aspects with regards to site specific environmental management.

The document will need to outline the below requirements (at a minimum):

- Site specific activities of the development.
- Address the associated environmental, social and heritage issues.
- Provide planned management strategies to avoid and minimize impacts.
- A CEMP/OEMP/DEMP will also provide a management plan for how wastes generated by the activities will be contained and cleaned-up appropriately.
- Environmental Monitoring Plan proposed during the project activity

6.2 CONSTRUCTION ENVIRONMENT MANAGEMENT PLAN (CEMP)

CEMP helps to ensure that construction development considers aspects of environmental protection and pollution control, in accordance with the requirements outlined in Omani/SEZAD and relevant International regulations. The CEMP shall -

- Specify the roles and responsibilities of personnel involved with all aspects of the construction activities;
- Provide effective, site-specific, and implementable procedures and mitigation measures to monitor and control identified environmental impacts (through previous studies including ESIA) throughout the construction phase of the project and
- Ensure that construction activities do not adversely impact health, safety, amenity, traffic, or the environment in the surrounding area.
- Establish procedures for audits, monitoring, and inspections; and specify training, recordkeeping, and documentation requirements.

The CEMP ensures that the environmental impacts identified will be properly managed and that activities will comply with all applicable environmental regulations. For any project, if previous ESIA was not completed then the CEMP should describe in further detail the extent to which environmental effects, impacts, and risks exist. Based on the aspects of the project, SEZAD EAD will decide whether a CEMP is required to be submitted.

A CEMP is intended for use by all personnel involved with construction activities; therefore, the use of technical terms and graphics should be clear and understandable to non-specialists.

6.3 OPERATIONAL ENVIRONMENT MANAGEMENT PLAN (OEMP)

The OEMP shall ensure that the operation of various establishments does not pollution of the land, water and air environments, either directly or indirectly by developing and implementing project and site specific environmental management practices. The OEMP shall:

- Provide effective and site-specific procedures to monitor and control the identified environmental impacts through the project commissioning and operation phase.
- Ensure that operation and associated activities do not adversely impact health, safety, amenity, traffic, or the environment in the surrounding area.

For any project, if previous ESIA was not completed then the OEMP should describe in further detail the extent to which environmental effects, impacts, and risks exist. Based on the aspects of the project, SEZAD EAD will decide whether an OEMP is required to be submitted. The OEMP shall also include changes in project implementation that were not considered in the previous studies or ESIA study. The OEMP shall be maintained as a "live" document capable of modification and updating during the project's life cycle or as circumstances dictate or as required by Authority.

6.4 DECOMMISSIONING ENVIRONMENT MANAGEMENT PLAN (DEMP)

The DEMP shall be a site-specific management plan to ensure that appropriate management practices are followed during the decommissioning phase of a project and to detail all remediation, site control, and monitoring activities that will continue once the decommissioning activities are completed. The DEMP shall include details on demolition, deconstruction, deactivation, decontamination, equipment removal, sampling, monitoring, and remediation. The DEMP shall include the following

- Method statement of decommissioning processes and equipment to be used
- Flowchart describing the decommissioning processes.
- A review of factors that have potential environmental impacts.
- Decommissioning schedule
- Monitoring and Corrective Actions Proposed.

6.5 BIODIVERSITY OFFSET PLAN

Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from development plans or projects after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity[2]. SEZAD biodiversity guideline is available on Biodiversity and Ecosystem Services[3]

6.6 ENVIRONMENTAL MONITORING AND AUDITING PROGRAMS

ESIA and EMP is also concerned with the design of a suitable monitoring programme the objective of which is to provide information to SEZAD and/or relevant authorities on the environmental compliance and the efficiency of the various mitigation measures. The Monitoring and Auditing section of the EMP or ESIA should include information regarding the monitoring and auditing of environmental performance, as well as information on reporting requirements, environmental checklists, and monitoring review, as discussed below. The environmental monitoring plan assesses the results, compares with the baseline studies and with national/international environmental guidelines.

The monitoring section of EMP's, during all stages of the project activity, should outline procedures for reporting requirements, including the frequency and content of required reports, such as the following:

- Operators arrangement for carrying out the work;
- Monitoring Location;
- Monitoring Parameters;

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[2] *Independent report on biodiversity offsets*, published by the International Council on Mining and Metals (ICMM) and the International Union for Conservation of Nature (IUCN), January 2013. Original source: http://bbop.forest-trends.org/pages/guidelines

[3] https://www.dugm.gov.om/upload/files/guidelines/Environmental%20Consultancy%20Services%20for%20Biodiversity%20and%20Ecosystem%20Services.pdf

- Method of Monitoring;
- Standard or Guideline to be used;
- Schedule and duration of monitoring and auditing;
- Evaluation of the result;
- Frequency of Reporting to Authority

The monitoring plan should also include monitoring of the health of person working in the plant particularly the health aspects related to occupational hazards, if required.

6.7 PREPARATION AND SUBMISSION TO SEZAD

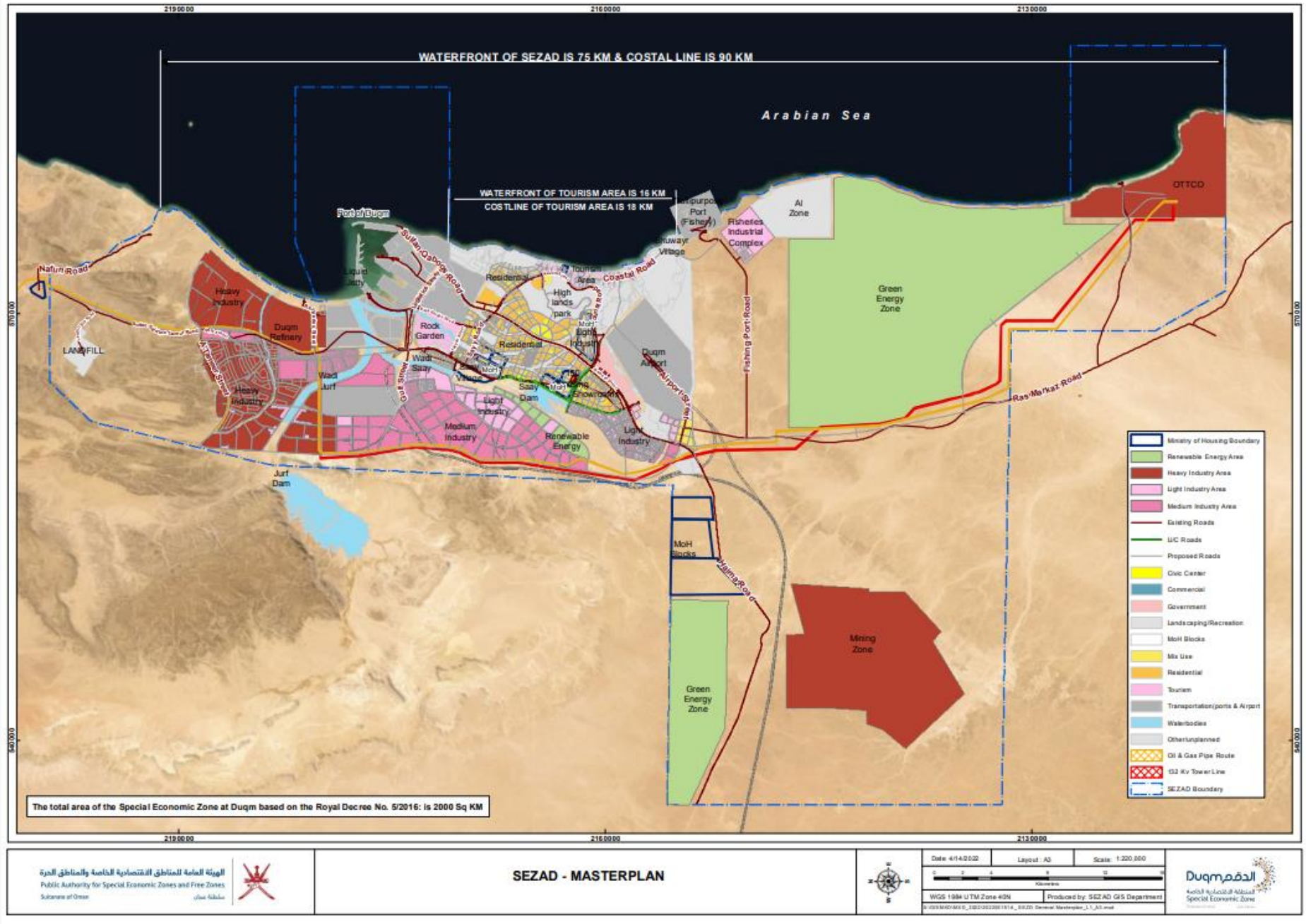
The EMP document should include the information provided within this guideline, prepared by a registered consultant. When the EMP is complete, it must be submitted to SEZAD for approval no later than 1 month prior to beginning the construction/operation/decommissioning activity unless otherwise agreed with SEZAD. The project activity will not commence until written approval has been received from SEZAD.

A recommended format of EMP shall be as follows;

	Chapter Name	Details Required
	Executive Summary	A summary of the CEMP/OEMP/DEMP shall be included In this chapter
Chapter 1	Introduction	Brief introduction and scope of the project, construction/operation/decommissioning and associated activity and need for EMP
Chapter 2	Project Description	a) Location b) Project Details including Utilities c) Construction/Operation/Decommissioning Activity - Description d) Environmental Permits - Existing permits and information on status of approval e) Project Phase Schedule
Chapter 3	Environmental Management	a) Environmental Management Systems b) Roles and Responsibilities c) Environmental Awareness and Training d) Environmental Commitments e) Communication and Consultation with External Entities and Addressing Complaints
Chapter 4	Environmental Mitigation	a) Air Quality Control Plan (including Dust, Gaseous Pollutant, Odour) b) Erosion and Sediment Management Plan c) Soil and Groundwater Management Plan d) Terrestrial Ecology Management Plan e) Wastewater Management Plan f) Marine Environment and Ecology Management Plan g) Noise and Vibration Management Plan h) Traffic Management Plan i) Waste Management Plan (Solid Waste, Liquid Waste, Hazardous Waste and ODS Management) j) Chemical and Hazardous Materials Management k) Archaeology and Cultural Management Plan l) Emergency Management Plan including Oil Spill Management Plan m) Emergency Procedure
Chapter 5	Environmental Monitoring and Auditing	a) Environmental Performance Monitoring b) Reporting Requirements including • Monitoring Compliance and Audit Reports • Environmental Checklists • Procedures to Review Inspections • Non-Compliance and Observations • Corrective Actions Proposed/Taken

Chapter Name	Details Required
Annexure	a) Laboratory Results b) Calculation sheets c) List of Existing Permits and Approvals d) Operational Procedure e) Material Safety Data Sheets f) Environment policy g) Environment manual

Appendix-A SEZAD ONSHORE & OFFSHORE BOUNDARY



Appendix-B PROJECTS REQUIRING ESIA

As per OPAZ Decision 17/2021, the following are an illustrative list of projects which require detailed ESIA study: -

1. Development and management of industrial estates
2. Development and management of logistic sites with an area of 10 hectares or more
3. Development and management of fishing harbours and fish industrial complexes
4. Development and management of tank farms for chemicals and petroleum storage, with an area of 5 hectares or more
5. Development and management of touristic villages with an area of 10 hectares or more
6. Petroleum refineries, chemical and petrochemical industries
7. Heavy industries
8. Hazardous and non-hazardous wastes landfill, treatment and disposal facilities
9. Construction of port quays and jetties
10. Fish farming with production capacity of more than 500 tons per annum for indigenous species, and any production capacity for exotic species
11. Electric power generating plants (Except for gas and renewable energy powered facilities)
12. Seawater desalination plants with production capacity of more than one million cubic meters per annum

Projects not listed above may also require an ESIA before a permit is granted by SEZAD. This shall be decided during the initial screening stage of the project.

MD 48/2017, Issuing the Regulation on organizing the issuance of environmental permits by Environment Authority, categorises the projects into three and listed the project which require mandatory ESIA study to be conducted, as part of permitting requirement. This list shall also be referred to.

Any of the above listed projects shall be exempted if the applicant is capable of convincing SEZAD that the project represents a minor change or only a minor addition to an existing project while the impacts shall not exceed the standards stated regarding the conservation of the environment.

Appendix-C TABLE OF CONTENT FOR ESIA REPORT

The Table of Contents (TOC) for the ESIA should have the following, at a minimum. The Executive summary shall be summarised at the beginning of the report.

5.8 Hydrology and Hydrogeology

5.9 Terrestrial Ecology

5.10 Marine Environment

5.11 Socio-Economic Setting

5.12 Archaeological and Cultural Heritage

6 PROJECT RELEASES TO THE ENVIRONMENT

6.1 Overview

6.2 Construction Phase Releases

6.*2.1* *Atmospheric Emissions – Point Sources, Area Sources, Mobile Sources, GHG Emissions*

6.*2.2* *Liquid Effluents – Domestic, Construction Water etc*

6.*2.3* *Solid Waste – Hazardous and `Non-Hazardous*

6.*2.4* *Noise – Ambient and Working*

6.3 Operation Phase

6.*3.1* *Atmospheric Emissions – Point Sources, Area Sources, Mobile Sources, GHG Emissions*

6.*3.2* *Liquid Effluents – Domestic, Process Water, Fire Fighting, Treated Effluent etc*

6.*3.3* *Solid Waste – Hazardous and `Non-Hazardous*

6.*3.4* *Noise*

Decommissioning

7 PROJECT ALTERNATIVES

7.1 Introduction

7.2 The “No Project” Alternative

7.3 Alternate Project Design, Location, Sourcing of Utilities Considered

7.4 Selection of Sources of Raw materials and Utilities – Alternatives Considered

7.5 Analysis of Best Available Techniques

8 CLIMATE AFFAIRS

8.1 Contact details

8.2 Ozone Depleting Substances (ODS)

8.3 Greenhouse Gas (GHG) Emissions - Construction and Operation Phase

8.*3.1* *GHG Emission from Energy Source - Combustion of Fuel from the Proposed Project – Construction, Operation Phase*

8.3.1.1 Stationary Combustion Processes

8.3.1.2 Mobile Combustion

8.3.1.3 Fugitive Emissions from Oil and Natural Gas System

8.3.1.4 Land Use and Land Use Change

8.3.1.5 Details of GHG Emission Calculation[1]

[1] Please provide information in detail